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AUTHOR Levenstein, Phyllis
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ABSTRACT

High school outcomes were assessed for 123 young adults, originally toddlers in the home-based, low-intensity Mother-Child Home Program (MCHP) and at risk for dropping out of high school because of their parents' low income and education. Participants were recruited for the Pittsfield, MA, replication of the MCHP and randomly selected into program and control status. The program's light touch was implemented through its unique method, based on interdisciplinary theory and consisting chiefly of home visitors modeling for mother and 2-year-old child, over 2 years, with a curriculum of playful verbal interaction around gifts of toys and books. As young adults, program toddlers were found to be less likely than controls to drop out of high school and more likely to graduate, matching the national middle-income graduation rate. Like all of its many replications, the Pittsfield replication of the MCHP had been certified by the Program's national center, after two years of implementation, to be an exact duplicate of the original. The results of this study suggest that the long-term achievement of successful academic performance may be accomplished by utilizing the non-didactic, play-oriented Mother-Child Home Program and demonstrate that this low-intensive and relatively inexpensive pre-preschool intervention is exportable to sites other than the original one. (Contains 78 references). (SD)

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**High school graduation effects of a verbal interaction program for at-risk toddlers:
A study of long-term outcomes in a replication of the Mother-Child Home Program**

Phyllis Levenstein

Adjunct Associate Professor, Interdisciplinary Program in Social Sciences, SUNY at Stony Brook

ABSTRACT

This paper describes the high school outcomes for 123 young adults, originally toddlers in the home-based, low-intensity Mother-Child Home Program (MCHP) * and at risk for dropping out of high school because of their parents' low income and education. They had been recruited for the Pittsfield, MA, replication of the MCHP and randomly selected into Program and Control status. The program's light touch was implemented through its unique method, based on interdisciplinary theory and consisting chiefly of home visitors modeling for mother and two-year-old child, over two years, a curriculum of playful verbal interaction around gifts of toys and books. Program toddlers were later less likely than Controls to drop out of high school (15.7% vs. 40.0%, $p = 0.03$) and more likely to graduate (84.1% vs. 53.9%, $p = 0.01$), matching the national middle-income graduation rate. Like all of its many replications, the Pittsfield replication of the MCHP had been certified by the Program's national center, after two years of implementation, to be an exact duplicate of the original. The results of this study suggest that the long-term achievement of successful academic performance may be accomplished by utilizing the non-didactic, play-oriented Mother-Child Home Program and demonstrate that this low-intensive and relatively inexpensive pre-preschool intervention is exportable to sites other than the original one.

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* In 1998 the Program's name was changed by the Board of Trustees of the not-for-profit Verbal Interaction Project, Inc., to *Parent-Child Home Program (PCHP)*, to reflect the growing participation of fathers. The National Center for Parent-Child Home Program provides training and technical assistance for implementing PCHP replications. It is located at 585 Plandome Road, Suite 105B, Manhasset, NY 11030.

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GENERAL INTRODUCTION

Today's society needs skilled technicians and professionals, and young people need such employment. Yet there is a surplus of unemployed young people, often high school dropouts from poverty backgrounds, who are unprepared for modern jobs that require at least a high school education and frequently either later technical training or a college degree. Without high school diplomas and therefore without adequate work earnings, many young adults must try to find other, sometimes criminal, ways to support themselves and the families they may acquire.

In response to this serious problem, high school graduation has been the eventual aim of most school readiness programs for preschoolers at risk for educational disadvantage because of their parents' low income and education. But only one low-cost home-based intervention, the Mother-Child Home Program (MCHP), started in 1965, has shown that the great majority of its former at-risk toddler-participants in a large program replication actually did graduate from high school.

The MCHP's unique method for accomplishing that goal is to increase at-risk toddlers' early cognitive growth by training home visitors to model for low-income mothers (or parenting persons) how to interact verbally with their two and three year olds around program gifts of attractive, commercially available toys and books. The home visitors' only role in home sessions is to show playful techniques of positive verbal interaction without any direct teaching or counseling; their qualifications may be minimal.

Evidence from the Pittsfield follow-up study described below ("hard" quantitative data in a long-lived replication of this seemingly simple program) demonstrated that its former at-risk toddler participants later earned high school diplomas at the rate of *eighty-four percent*, the same rate as that of middle-income students nation-wide (Levenstein et al., 1998). This rate is far above the approximately sixty-four percent expected nationally for students from disadvantaged backgrounds.

The home-based Mother-Child Home Program (MCHP) differs in fundamental ways not only from center-based early childhood programs but also from all other home-based programs. The MCHP is non-intrusive, non-didactic, highly motivating and of relatively low-cost. The parent (usually the mother) is viewed as the key member of a team focused on helping the two-to-four-year-old child by its unusual play-oriented method that captures the willing participation of parent and child. It is inviting and simple enough for parents of any education to become involved enthusiastically -- and effectively.

The MCHP was designed to sever the now well known link between poverty and low school achievement, inspired first by Hunt's impressive review of the positive effects of early environmental stimulation on the cognitive growth of children (1961). Equally influential were investigations of family influences on child development (e.g., at first Bernstein, 1961 and Hess & Shipman, 1965; and later, Clarke-Stewart et al, 1979; Bee et al, 1982; Sameroff, 1982; Laosa, 1983; Scott-Jones, 1984; Bradley & Caldwell, 1984;) which have revealed that parents can play a crucial role in disadvantaged children's acquisition of school readiness and literacy.

The Mother-Child Home Program: General Principles and Procedures

The Mother-Child Home Program (MCHP) was launched by the Verbal Interaction Project (VIP) in 1965 (Levenstein, 1970; Levenstein & Sunley, 1968). The theoretical and empirical foundations for its method were drawn from the fields of anthropology/linguistics (Sapir, 1922), philosophy (Cassirer, 1944), psychology (Baumrind, 1967; Bruner, 1964; Deutsch, 1965; Hunt, 1961; Sigel, 1964; Vygotsky, 1962), and sociology (Bernstein, 1961). Central to this foundation is the concept that humankind is the "animal symbolicum," uniquely capable of conceptual-symbolic thought (Cassirer, 1944), and that this capability begins in the latter part of the second year of life (Vygotsky, 1962; Bruner, 1964).

Parent-toddler verbal interaction gives young children the opportunity to develop concepts, "the intellectual tools for organizing the environment, for reducing ambiguity and imprecision, for ordering diversity into classes or categories" (Sigel, 1964). By 1965 research had shown that low-income families are often characterized by curtailed conceptual verbal interaction between toddlers and parents, thus limiting cognitive growth and increasing the toddlers' risk of later school failure. More recent research has supported earlier investigations by finding through home observations a very low rate of verbal interaction in low-income homes (Hart & Risley, 1992) and a correlation between the amount of verbal parent-child interaction when the child is ten to 36 months old, and the child's cognitive performance at age eight years (Hart & Risley, 1995). Verbal interaction with parents offers young children an opportunity to develop basic concepts necessary for cognitive growth and later school competence.

Chief in the body of supportive empirical studies were those of Bruner (1966), Sigel (1964) and Vygotsky (1962). Their work suggested that the promotion of playful verbal interaction between parents and children within their reciprocally attached relationship could strengthen toddlers' symbolic/conceptual development and promote mothers' self-confidence (Levenstein & O'Hara, 1993). The program's cognitive curriculum was derived from Vygotsky's links between thought and language (Vygotsky, 1962); Bruner's construct of "instrumental conceptualism," the idea that concept formation is fostered in the two and three year old child through the interaction of the child's experience with language (Bruner, 1966); and Sigel's "distancing hypothesis" (Sigel, 1971) in which the promotion of representational competence is given tangible meaning through the child's and parent's play focused around books and 3-dimensional toys as representations of reality, besides being intrinsically motivating curriculum materials.

The MCHP's distinctive low-intensity, non-didactic method for meeting the challenge of increasing low-income children's early cognitive growth was to motivate their mothers (or other primary nurturers) to act as facilitators for embedding conceptual verbal interaction into toddlers' early positive experiences within the family home. This was accomplished by exposing low-income two and three year olds to home-based stimulation of verbal interaction with their mothers (or parenting persons), around program gifts of attractive, commercially available toys and books. Home visitors (HVs, first called "Toy Demonstrators" in the original MCHP) would show (not teach) the parent, usually the mother, playful techniques of positive verbal interaction -- conversation -- in ways designed to support weaving such interaction into the fabric of family experience and to encourage an autonomy which could eventually make the parent's behavior independent of the MCHP.

After a small pilot study of the MCHP in 1965 demonstrated significant short-term effects (Levenstein & Sunley, 1968), the fully developed program was named one of the two best early childhood programs in the country by the American Institutes of Research for the Behavioral Sciences, for the U.S. Office of Education (Wargo, Campeau & Tallmadge, 1971). A number of subsequent experimental subject-randomized and location-randomized studies found positive outcomes for the MCHP.

In those early studies, the short-term cognitive gains of several yearly cohorts of the original MCHP children lasted into third grade (Consortium for Longitudinal Studies, 1983; Madden, Levenstein, & Levenstein, 1976; Levenstein, O'Hara, & Madden, 1983; Barnett, 1995). Program children continued to be superior to similar non-program children (randomized by location) in their scores on cognitive measures and/or standardized academic achievement tests through fifth (Lazar & Darlington, 1982, Table 14) and seventh grades (Royce, Darlington and Murray, 1983). The comparisons of baseline characteristics among children with and without these follow-up studies showed that attrition did not account for the attained effects.

Randomization by location was adequate in the Verbal Interaction Project's in-house research, so that assignment to program or control groups was independent of self-selection. These studies counted as MCHP children all who had enrolled in the MCHP, regardless of whether they had completed the full program, following the most rigorous research standards.

A follow-up study, consisting of videotaped play sessions between disadvantaged children and their mothers two years after completion of the program, demonstrated a lasting superiority of program mothers' verbal interaction with the child over that of nonprogram mothers and showed significant correlations with several aspects of the child's first grade cognitive skills and emotional stability: "enjoys mastering new tasks;" "is well-organized;" "is creative but knows difference between facts and fantasy;" "seems cheerful and content;" and "is spontaneous without being explosive," (Levenstein & O'Hara, 1983, 1993). These conclusions supported results of a previous follow-up study (Levenstein, 1979) of the correlation between mothers' verbal responsiveness near the program's termination and children's first grade skills.

These encouraging findings elicited Bronfenbrenner's speculation as to factors within the MCHP that might have been responsible for the results (1974), i.e., that one major catalyst might be the depth of parental involvement in the program:

"Levenstein's strategy has as its target not the child as an individual, *but the mother-child dyad as an interactive system* [italics his]. . . . Moreover, since it is the product of mutual adaptation and learning, the system exhibits a distinctive hand-in-glove quality, and thereby an efficiency, that it would be hard to achieve in non-enduring relationships. Finally, since the participants remain together after intervention ceases, the momentum of the system insures some degree of continuity for the future."

Four early replications of the MCHP (Levenstein, 1975) tested the exportability of the program, a "replication" having been defined by the Verbal Interaction Project (VIP) as an exact duplication of the method, curricula and delivery of the Mother-Child Home Program. The VIP chose "replication" over "close approximation" to emphasize the importance of authenticity in those three program basics. The VIP then began training replication staff nation-wide, with safeguards for program standards.

In sum, the relatively short-range evaluations of the MCHP have indicated that the program does favorably influence the child's subsequent intellectual functioning (Barnett, 1995; DeVito & Karon, 1984; Lazar & Darlington, 1982, Table 14; Levenstein, 1975; Levenstein, 1976; Levenstein, & Levenstein, 1976; Levenstein, O'Hara, & Madden, 1983; Madden, Levenstein, & Levenstein, 1976; Royce, Darlington and Murray, 1983). These findings are particularly the case for children deemed most at risk for slow conceptual development and subsequent inadequate school functioning. In addition to these intervention successes, first replications demonstrated that the program is exportable, since similar findings occurred early in four replication sites (Levenstein, 1975).

Parent-Child Home Program (Pittsfield replication of the Mother-Child Home Program)

The Parent-Child Home Program (PCHP) in Pittsfield, Massachusetts schools began its MCHP replication in 1970, serving low-income, low-educated parents and their small children at high risk for educational disadvantage, and funded under Title One of the 1965 federal Elementary and Secondary Education Act. Given the PCHP's 1972 certification by the Verbal Interaction Project as an authentic replication of the Mother-Child Home Program; yearly administrator reports of program operation; periodic site visits by staff members of the National Center for Mother-Child Home Program; and a 1996 site visit to the PCHP by outside consultants (Sullivan Educational Associates, 1996) supported by a private foundation, it can be assumed that the PCHP is an authentic replication of the Mother-Child Home Program. The PCHP's only modifications of the original MCHP were two nomenclature changes: calling the program the Parent-Child rather than the Mother-Child Home Program, and naming its home visitors "Teaching Demonstrators" rather than "Toy Demonstrators." It set as criteria for program eligibility the presence of five out of seven signifiers of the at-risk status of children.

Among the most important of the MCHP's methods followed in the Pittsfield replication were:

- 46 biweekly, half hour Home Sessions spread over seven months in each of two years;
- A cognitive curriculum summarized in a "Guide Sheet" for each Home Visitor (HV) and modeled for the parent around program gifts of toys and books.
- A "parenting" curriculum in a VIP-created instrument, "Parent and Child Together."
- VIP criteria for attractive curriculum materials, "Verbal Interaction Stimulus Materials (VISM)": 12 illustrated books and 11 toys permanently assigned during each of two years.
- Involvement of parents in the child's play by inviting the parent to participate in the verbal interaction techniques modeled by the HV;
- Paraprofessional home visitors (HVs) trained to model positive verbal interaction curricula around books and toys, write Home Session reports, meet with the Coordinator for weekly group guidance and occasional individual sessions, and empathize with parents without instructing, counseling, or becoming a close friend;
- As Program Coordinators, professionals sensitive to nuances of family relationships who lead weekly HV group meetings, demonstrate the verbal interaction curriculum, order and inventory books and toys; compose verbal interaction activities around the books and toys to illustrate the stable cognitive curriculum on Guide Sheets; and maintain collegial contacts with sponsoring organizations.

The Pittsfield PCHP was assessed regularly by independent evaluators for its effects on children's academic achievement through eighth grade through 1984. Program participants' eighth grade test scores

in reading, language and math significantly surpassed those of Chapter One (now "Title One") students who had not participated in the PCHP, and their math scores were on a par with those of non-PCHP, non-Chapter One students in the same school system. The evaluators commented on page 24 of their report to the Pittsfield Public Schools (DeVito & Karon, 1984): "Overall, it appears that program intervention [PCHP] for these students as two and three year olds had lasting effects since as a group throughout school they met or exceeded national achievement norms and generally outperformed the groups to which they were compared."

In 1996, when the Pittsfield replication of the MCHP was in its twenty-sixth year, an opportunity arose to perform a follow-up study of its toddler participants' high school outcomes, taking advantage of records kept by the school system and the PCHP, and of the availability of a randomized control group. The cognitive and academic achievements previously cited for Pittsfield program and non-program students in Title One-supported schools had been interpreted as being predictive of later success in high school (Levenstein, 1988). A follow-up study would make it possible to explore whether these outcomes were valid predictors of high school graduation. This report describes PCHP participants' academic performance as reflected in high school graduation by June 1996, examining the high school dropout and high school graduation rates of five yearly cohorts of PCHP toddlers who completed their careers in the Pittsfield school system. Subjects included students who had completed the full two-year PCHP; others who had enrolled but who participated for less than two years; and a group of students who had been screened as toddlers for the PCHP and had demonstrated the same five risk factors required for program eligibility but who had been randomly assigned to nonprogram status.

METHOD

Participants

The participants of the present study are 123 students who at approximately age two, in 1976-1980, had been recruited for the Parent-Child Home Program. The 1976 toddlers were the first group for whom reliable and complete high school graduation records were available. The five study cohorts had by 1996, 16 to 20 years later, become young men and women aged between 17 and 22 years, comparable with the subjects on a study of national high school data reported by the U.S. Department of Education Center for Education Statistics (Sanderson et al, 1996; McMillen & Kaufman, 1996). Parents of the original two year olds had been recruited for the PCHP by invitations sent to parents of all students attending the city's Title One elementary schools.

All dyads who met the criteria in 1976, 1977 and 1978 were offered the PCHP. However, because a subject-randomized experimental study of the PCHP was being considered at the state level, the 1979 and 1980 cohorts of eligible dyads were randomly divided into PCHP and Control groups, with an explanation to families that limited funds would make a lottery necessary. Only 10 dyads were randomized as controls in 1979, and eleven in 1980.

All parents who were offered the PCHP accepted enrollment, as did those in the Control group. Their degree of program participation was measured by the number of toys and books -- Verbal Interaction Stimulus Materials (VISM) -- received by each dyad, out of a possible total of 23 in each of two years or 46 in all (one for each two Home Sessions). Toddlers were considered to have completed the full two-year program if they received at least 35 VISM out of the possible 46 (75%). The actual mean number received

by the original 113 dyads in this group was 44.8 VISM (97% of the possible 46). The original 44 dyads who received 16 to 34 VISM, 35% to 74% of the planned number, were classed as having had the equivalent of one year of the program; their actual mean number of VISM was 23.6. Thirty-one dyads in the 1976 to 1979 cohorts withdrew from the program before arriving at 16 VISM; they actually received an average of 7.9 VISM or 17% of the possible 46. No 1980 dyads fell into this group. The 21 Control dyads in the 1979 and 1980 cohorts, who received no part of the PCHP but met criteria for PCHP eligibility, brought the total of original program and nonprogram dyads to 209.

Data collection and analysis

The data for the present analyses were collected from subject records of the Parent-Child Home Program, and from records on file in the offices of the Pittsfield school system, up to date as of June 1996. The study's school data were checked for accuracy by school district personnel who had no knowledge of subjects' program status. Though most demographic baseline data and scholastic data had unfortunately been discarded by the school over the years to conserve space, the PCHP had preserved names, birthdates, gender and cognitive test scores and PCHP data where appropriate on every subject who had ever entered the PCHP or had been in the control group.

Group differences were compared using relatively simple analyses: chi-square tests for categorical variables and the student t test for continuous variables, utilizing Statview statistical software for Apple Macintosh. Multivariate analyses (multiple logistic regression) were performed using SPSS for Windows. All p values are two-tailed.

RESULTS

Outcomes

Subjects and Data Analyses. Of the 209 at-risk toddlers in the original parent-child dyads, 123 students (58.9%) had completed or were completing their school careers within the Pittsfield school system and could therefore be included in the 1996 follow-up study. Six of the 123 were not yet in their last year of high school by June 1996, leaving 117 who had reached the end of their secondary school career. The chief analyses, of high school graduation, were performed on these 117, whereas examination of dropout rates was performed on the entire group of 123.

The major reason for students' non-inclusion as 1996 subjects was having moved out of the school district, primarily because of parents seeking work elsewhere due to the gradual reduction of the primary industry's work force. In this geographically mobile population, six of the children who withdrew from participation in the PCHP because of moving away from Pittsfield later transferred back into the Pittsfield schools and were therefore available for follow-up. Some attrition due to geographic mobility took place during or shortly after families' first year of participation in the PCHP, but most occurred during the 16 to 20 years of the follow-up period. Three children died while enrolled in school. Given the high rate of loss to follow-up (41.1 %), it was particularly important to see whether the groups were comparable at baseline. As can be seen in Table 1, there was no significant or substantial difference in age, sex or baseline Peabody Picture Vocabulary Test (PPVT) IQ scores between subjects with or without follow-up.

Similarly, there were no significant baseline differences between the total pooled program subject

group and the randomized controls, though there was a non-significant trend for controls to have lower PPVT scores than program children. Children who received the full program did enter the program at a significantly younger age than early program dropouts and had significantly higher pretest PPVT scores than either program dropouts or controls.

(Insert Table 1 about here)

Thirty of the 123 subjects (24.4%) had dropped out of school by June 1996. Excluding the six who were still in school, 87 of the remaining 117 had graduated from high school (74.3%).

As shown in Table 2, there were significantly higher rates of high school graduation (84.1%) and lower rates of dropping out of high school (15.7%) among students who had completed two full years of the Parent-Child Home Program as toddlers than among randomized controls (53.9% graduated, 40.0% dropped out). Academic performance in students who had been exposed to less of the PCHP was intermediate.

(Insert Table 2 about here)

One limit to the interpretation of these results is that the absence from the full program group of dyads who began the PCHP but did not complete it could have introduced a bias in favor of positive findings. We therefore performed additional analyses classifying subjects according to program enrollment rather than by program completion, thus including as program subjects all dyads who were offered the PCHP whether or not they completed the prescribed two years of the program. This intention-to-treat approach analyzes all subjects assigned to treatment or control groups, whether or not the subjects actually completed the treatment to which they had been assigned. Intention-to-treat analyses of the present data showed that among the 117 subjects who were no longer in high school, 76.9% of all subjects in the experimental group and 53.8% of controls had graduated from high school (chi-square = 3.228, $p = 0.07$); these outcomes correspond to a Relative Risk of 1.43, and to a crude Odds Ratio of 2.86. Among all 123 traced subjects, 22.2% and 40.0% respectively had dropped out of school (chi-square = 2.26, $p = 0.13$).

Thus, children who were offered the program did better than randomized controls on both measures even if all program enrollees are included, an advantage which in the case of high school graduation approaches statistical significance despite the tiny number of controls.

A second problem is that, as was seen in Table 1, the randomization process had yielded a control group with slightly lower baseline IQs (mean 82.7) than either the 1979-80 program enrollees they were directly randomized against (88.8) or the program group as a whole (87.5, $p = 0.20$). Not unexpectedly, baseline IQ was predictive of academic performance; mean IQ was 89.2, 80.7, and 82.5 among high school graduates, dropouts, and current students respectively ($p = 0.02$ by ANOVA). Although the difference in baseline IQ between the entire group of program enrollees and the randomized controls was not statistically significant, it could have had an impact on the results of intention-to-treat analyses.

(Insert Table 3 about here)

We dealt with these differences in preprogram IQ by using two approaches. One was to adjust for IQ using multivariate analyses (multiple logistic regression), and the other was to reanalyze the data among only low-IQ subjects. The results of these techniques are summarized in Table 3. It can be seen that the Odds Ratios in the "Adjusted for baseline IQ" column are all greater than 2.0. This suggests that whichever technique is used, PCHP enrollees or completers are more likely to graduate from high school 16 to 20 years later, after taking baseline IQ into account. It might be noted that the greatest educational advantage (the highest adjusted O.R.) was found for the lowest-IQ toddlers, those with baseline IQs < 90.

Since there was no significant difference in graduation rates between students randomized to the program in 1979 - 1980 (69%) and those enrolled in the PCHP in 1976 - 78 (76%), all five program cohorts were combined for purposes of most analyses. When the validity of this approach was tested by repeating the principal analyses within the directly randomized 1979-80 cohorts, the results were essentially unchanged (Table 3).

Given the limitations of this study, it was felt appropriate to cross-check the suggestion of program efficacy by comparing the performance of PCHP students with that of several historical comparison groups. The dropout rate among all youngsters who entered the PCHP (22.2%), and especially among those who completed the full program (15.7%), was lower than the later cumulative Pittsfield city dropout rate of 25.9%.

The program statistics also compare favorably with the national dropout rate of 27.4% for U.S. students of low socioeconomic status, defined as the lowest quartile of all family income levels, as presented in a 1994 study of a national cohort of 1988 eighth-graders (Sanderson et al., 1996, based on McMillen & Kaufman, 1996), even though only 54.8% of the national cohort had two or more risk factors (Sanderson et al., 1996) vs. 100% for all PCHP screenees. The full program group's graduation rate of 84.1% slightly exceeds the 83.7% graduation rate of middle-socioeconomic-status students in the same 1994 follow-up study.

DISCUSSION

The chief focus of this study is on the long-term follow-up of a replication of the Mother-Child Home Program, a low-intensive, non-didactic verbal interaction pre-literacy intervention designed to promote the conceptual/cognitive growth of at-risk toddlers and thus improve their readiness for literacy (Bronfenbrenner, 1974; Hunt, 1975; Levenstein, 1988; Wargo, Campeau & Tallmadge, 1971). The analyses showed that 17 to 22-year-old young adults who had completed the Pittsfield Parent-Child Home program as toddlers were less than half as likely than randomized controls to have dropped out of school. Their high school graduation rate was similar to that of middle class students, and exceeded those of local and national disadvantaged comparison groups.

In order to evaluate the possibility that the results might have been influenced by parents' self-selection -- since less promising children may have been more likely to drop out of the PCHP before completing it -- results were also analyzed on an "intention to treat" basis. In this approach all subjects who were offered the program were included in the program group whether or not they had completed the full program. Using these rigorous criteria, the advantage of the program group over randomized controls approached but did not meet statistical significance. This superiority of program children could be accounted for only in part by differences in baseline characteristics.

Although it must be emphasized that interpretation of these results is limited by the small number

of controls, by the failure of some differences to reach statistical significance, and by the dearth of demographic and pre-graduation scholastic data on the study subjects, the findings would appear to suggest that socioeconomically disadvantaged toddlers who complete an authentic two-year Mother-Child Home Program replication have bettered their chances of achieving high school graduation, that even incomplete PCHP participation may improve students' chances of graduation, and that those toddlers who start the PCHP with the lowest IQs may reap the most benefit.

It should be noted that enrolling parents in voluntary interventions or research with their young children inevitably entails some degree of self-selection which may result in bias in favor of the intervention when non-randomized comparison groups are used. In other recently published childhood intervention studies, for example, participants volunteered from among a much larger pool of potential subjects approached through schools, local newspapers, bulletin boards in public libraries, etc. (Bornstein, Haynes, O'Reilly, & Painter, 1996; Creasey, & Reese, 1996; Feeny, Eder, & Recorla, 1996; Krevans & Gibbs, 1996; Lehman, Arnold, Reeves, & Steiner, 1996; Liben & Yekel, 1996; Matthews, Ellis, & Nelson, 1996; Nucci & Weber, 1995).

The high attrition rate of the subjects in this study (41% at 16 to 20 years after participation in the program) is another weakness that is shared by many other studies that involve parents with their children. For example, at 12 years after children ended participation in preschool programs examined in the Consortium for Longitudinal Studies (Lazar & Darlington, 1982) an average of 55.8% of subjects in the 11 programs under scrutiny had been lost to follow-up. In six recent follow-up studies involving children, published in *juried journals* in 1996 and 1997, attrition rates were 18 - 19% after 3 - 4 years (Harrist et al, 1997; Kochanska, Murray, & Coy, 1997); 17 - 32% after 10 - 11 years (Rose & Feldman, 1996; Ensminger et al., 1996; DeBerry, Scarr, & Weinberg, 1996); and 48% after 18 years (Pakiz, Reinherz, & Giaconia, 1997).

The question might be raised whether other intervening learning experiences available in Pittsfield (e.g. a center-based preschool for four year olds conducted by the school district and Chapter One remedial services in elementary school) could have contributed to the apparent effects. No data are available for directly examining this possibility. Although there seems to be no reason that the full-program PCHP completers should have been preferentially offered such remedial services, it cannot be excluded that PCHP graduates might have taken greater advantage of such opportunities, possibly in relation to greater parental motivation.

The possibility that the MCHP might have long-lasting positive effects seems to be made plausible by several elements of its approach. One is reflected in Bronfenbrenner's speculation (1974) that "the momentum of the system" could insure enough continuity of parental verbal interaction into the child's future to support the child's academic progress long after the parent had terminated connection with the PCHP.

Another key element could be the choice to intervene using the MCHP during a period of early childhood that may be critical for the emergence of the child from the stages of enactive and iconic representation of the world into the verbally symbolic mode necessary for growth of conceptualization and thus of intellectual development (Bruner et al, 1966; Vygotsky, 1962).

Yet another factor in any positive long-term positive outcomes may be the role of parental motivation in entering and completing a program (White, 1959 and 1963). Initial parental enrollment rates

in MCHP replications of close to 100% are abetted by the offer of tangible gifts of attractive toys and books, and most families (54.1% in the present study) stay for the full two years of the program. Also, the program was specifically designed to be non-didactic and permeated with a playful spirit intended to make learning and the road to literacy intrinsically motivating and fun for both child and parent. The 1994 National Assessment of Educational Progress study of national reading achievement found that the contextual element of fun characterizes the experience of expert readers at every grade level tested (Campbell, Donahue, Reese & Phillips, 1996).

The importance of any benefits the MCHP may have for disadvantaged children is enhanced by several side benefits. The program provides entry level employment and closely supervised training in basic entry-level work skills for home visitors who often have little education and may never before have held paid jobs. It appears to foster the readiness of participant mothers and home visitors for school completion as well as for employment (Levenstein, 1988).

It should be recalled that the present report does not come from the setting in which the original model was developed but from an authentic replication conducted by a school district. Veterans in the field of innovative educational intervention programs are familiar with examples of methods that work fairly well in the relatively protected environment of their original sites but whose benefits and even methods dissipate when the program is adopted in "real world" locations. The favorable high school outcomes described in this report suggests that the method can be successfully exported with its essentials intact, at a relatively low cost (about \$2000 or less per family in 1998). These practical program considerations, coupled with the encouraging findings of the present exploratory study, suggest that society's attempts to avoid the human and fiscal costs of the continuing family cycle of poverty might be aided through wider utilization of the Mother-Child Home Program.

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